

Acknowledgements

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graph TD
 User --> VQI[Visual Query Interface
(MQuery / Browse / Keyword)]
 User --> MiMI[MiMI Schema]
 VQI -- XQuery --> SOAPClient[Web SOAP client / GUI SOAP client]
 MiMI -.-> VQI
 MiMI -.-> Trans[Transformation Module]
 SOAPClient --> SOAPServer[SOAP Server]
 SOAPServer <--> Timber[(Timber)]
 SOAPServer <--> Int[Integration Module]
 SOAPServer <--> Prob[Probability Module]
 Trans --> Int
 Trans --> Prob
 Int --> Timber
 Prob --> Timber

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## Statistics

[illegible]

## InterPro

[illegible]

# HPRD

## Merging Guidelines


- Preserve all data
- Maintain provenance
- Utilize an identity function to determine whether two objects are fundamentally the same in the real world and should be consolidated

- 9,860 Center for Cancer Systems Biology Records
- 287,072 BIND Records
- 94,533 HPRD Records
- 73,561 DIP Records
- 69,065 GRID Records
- 130,622 IntAct Records
- 5,178 Max Delbrueck Center Records
- 89,662 Reactome Records

[illegible]

## MQuery Interface

- **Traditional**
  - **Browse**: Enables users to trawl through records of interest
  - **Keyword**: Facilitates easy lookup of a particular record
  - **XQuery**: Permits users to write their own sophisticated XQuery
- **MQuery**
  - Allows users to point-and-click queries
  - Teaches users by example how to use XQuery
- **NaLIX**
  - An extension that allows users to write natural language queries against the database



The screenshot shows the Protege 4.2.2 GUI with the 'Schema Display' tab selected. The left pane shows a tree of classes: Interaction, InteractionSite, InteractionType, and InteractionLink. The main pane shows the 'Constraint Specification' tab with a table of constraints. The table has columns: Return ID, Element, Condition, and Scope (ID). The first constraint is 'InteractionLocation' with the condition 'InteractionLocation = ?value'. The second constraint is 'moleculeAt' with the condition 'moleculeAt = ?value'. The third constraint is 'moleculeAt2' with the condition 'moleculeAt2 = ?value'. The 'Order By (ID)' column is empty. The 'Generate Query' button is highlighted. The 'Query Generation' tab is also visible, showing a SPARQL query: 'SELECT ?x WHERE { ?x rdfs:type <http://www.protege-project.org/ontology/InteractionLocation> . }'.

## MQuery Advantages

- **Simplicity**
  - Users pose declarative queries in XQuery without prior knowledge of
    - XQuery syntax
    - Schema of the database
- **Expressivity**
  - MQuery is more expressive than traditional (static) form-based interfaces which are typically ad hoc and non-extensible
- **Compatibility**
  - MQuery is HTML-based and can be loaded and viewed on any standard web-browser

## Features

## Provenance and Probability

| <b>Calmulin D</b>                                  |                                                                                                                                             |
|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Molecule ID                                        | 104                                                                                                                                         |
| Other name:                                        | CALM; CALM1; Phosphoribosyl kinase, delta; PRKQ                                                                                             |
| Uniprot name:                                      | CALM; CALM1; Calmodulin 2; CALMD; PRRKD                                                                                                     |
| External references:                               | RH-8920411675, Uniprot: A77860.1114<br>PAPDB: PF00334.26, JGI:JGI_111555.6, HPRD:HP0244.02724,<br>Olipop_114151312.14382, consmap: GSI1-BIS |
| Description:                                       | Calmodulin                                                                                                                                  |
| Type:                                              | protein                                                                                                                                     |
| Cellular Compartment:                              | cytosolum (GO:0005737), nucleus (GO:0005634), plasma membrane (GO:0005887)                                                                  |
| Molecular Functions:                               | Calcium ion binding (GO:0005509)                                                                                                            |
| Biological Processes:                              | Signal transduction (GO:0007165); Ore contraction (GO:0007164)                                                                              |
| Domain:                                            | EF [12-40]; EF [46-76]; EF [89-113]; EF [121-149]                                                                                           |
| Potential Transcriptional Regulation Interactions: | nucleation [116]                                                                                                                            |
| Interactions:                                      | Interaction: 105 (with Moleculin B) [42]                                                                                                    |
|                                                    | <a href="#">POSSIBLE INTERACTIONS</a>                                                                                                       |

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[RPO21] -- [RPBS]

|                |                                                      |
|----------------|------------------------------------------------------|
| Interaction ID | 34                                                   |
| Molecule ID    | 28                                                   |
| Molecule Name  | RPO21                                                |
| Molecule ID    | 9                                                    |
| Molecule Name  | RPBS                                                 |
| Experiments    | Amyloid                                              |
| Ligand         | Tactile Nerve [1.25], Affinity Phagocytosis [1.BB9C] |
| K <sub>d</sub> | 4905                                                 |

- **Provenance**
  - Tracks data origin
  - Describes manipulations being performed on the data
  - Enables users to decide which sources they trust and wish to retrieve
- **Probability**
  - Utilizes reported false positive/negative rates of experiments as base probabilities
  - Deduces the probability of an interaction based on base probabilities using standard probability model
  - Allows users to adjust the default probabilities of given experiments or interaction

## Interaction Prediction

**Q: Does Cyclophilin-40 interact with Hsp90 in *Bos taurus* ?**

[illegible]

| ENPL_BOVIN          |                                                                                                            |
|---------------------|------------------------------------------------------------------------------------------------------------|
| Accession ID        | 103                                                                                                        |
| External References | RefSeq NM_001312670.1, GI:5052752                                                                          |
| Description         | Heart shock 90K protein L, alpha                                                                           |
| Type                | protein                                                                                                    |
| Homology            | blast:NCBI2.0, Pfam:PF00111, Interpro:IPR000973, InterProScan:IPR000973, Gene:29500556, InterPro:IPR014914 |
| Interactions        | Protein Interactions                                                                                       |

**No Record!**

**Saccharomyces cerevisiae**

**Cpr7**

|                     |                                                                                                    |
|---------------------|----------------------------------------------------------------------------------------------------|
| Molecular ID:       | 100                                                                                                |
| External reference: | GI:6322492                                                                                         |
| Description:        | Cytoplasmic-KD-like protein                                                                        |
| Type:               | protein                                                                                            |
| Homology:           | Wan:W04760, Wan:W04761, InterPro:IP002130, InterPro:IP002130, InterPro:IP002130, InterPro:IP002130 |
| Interactions:       | Interacts with 132 (with Molecular ID: 132)                                                        |

Protein interactions

|                    |                                                                                       |   |
|--------------------|---------------------------------------------------------------------------------------|---|
| Accession ID       | 101                                                                                   |   |
| External Reference | 61-208115                                                                             |   |
| Description        | ATP-dependent molecular chaperone HSP62 (heat shock protein Hsp90 co-chaperone [ecm]) | 9 |
| Type               | protein                                                                               |   |
| Homology           | TransFP02516 (TransFP0103; InterPro:IP000607; InterPro:IP000229; InterPro:IP001454)   |   |
| Interactome        | InteractomeID_115 (w/ Hsp62/ID_101)                                                   |   |
|                    | Possible Interactions                                                                 | 1 |

| [HSCB2] -- [Cpr7]   |                                |
|---------------------|--------------------------------|
| Information ID      | 119                            |
| Molecule ID         | 100                            |
| Molecule Name       | HSCB2                          |
| Molecule ID         | 101                            |
| Molecule Name       | Cpr7                           |
| Experiment          | affinity chromatography [0.75] |
| Publications (PMID) | 8922864                        |
| UnifracID           | 5.75                           |

**Interaction exists  
in *S. cerevisiae***  
A literature search  
discovered a reported  
interaction between  
homologous proteins  
Cyclophilin-40 – Hsp90  
in *B. taurus*.